ABSTRACT

SATELLITE RADIODETERMINATION

A satellite radiodetermination system comprises global navigation service (GNSS) satellites 2 such as GPS satellites, which generate GNSS ranging signals R_n, geostationary satellites 6 which retransmit ranging signals R_g generated at a navigation land earth station (NLES) 8, including augmentation data A, and medium earth orbit (MEO) satellites 10 which generate ranging signals R_m including regional augmentation data RA transmitted from a satellite access node (SAN) 14. The regional augmentation data RA is supplied by regional augmentation systems 21a, 21b.

A navigation receiver 11 receives the ranging signals R_g, R_m, R_n and calculates ionospheric delay values for those ranging signals which are provided on dual frequencies. Using these ionospheric delay values, and optionally the regional augmentation data RA and the augmentation data A, the navigation receiver estimates ionospheric delay values for those ranging signals which are provided on single frequencies. The navigation receiver uses the ranging signals, corrected for ionospheric delay and errors indicated by the augmentation data A and regional augmentation data RA, to calculate position and time accurately.

[FIG. 1]